WE CLAIM:

1. An apparatus for process control in a combustion application, comprising:

   a) transmitting means for transmitting a near-infrared laser beam through off-gas produced by the combustion application;

   b) detecting means for detecting the transmitted laser beam and converting the detected laser beam to an electrical signal; and

   c) a control system for providing adjustment of select inputs to the combustion application in response to the electrical signal from the detecting means.

2. Apparatus according to claim 1 wherein the wavelength of the laser beam is in the range of about 0.7μm to about 3.0 μm.

3. Apparatus according to claim 2 wherein the transmitting means is a tunable diode laser.

4. Apparatus according to claim 3 wherein the wavelength of the laser beam is in the range of about 1.5 μm to about 1.7 μm.

5. Apparatus according to claim 3 wherein the transmitting means is a distributed feedback laser.

6. Apparatus according to claim 5 wherein the wavelength of the laser beam is in the range of about 1.57 μm to about 1.59 μm.

7. Apparatus according to claim 1 wherein the select inputs to the combustion application comprise oxygen.

8. Apparatus according to claim 1 wherein the select inputs to the combustion application comprise fuel.

9. Apparatus according to claim 1 wherein the select inputs to the combustion application comprise electric power.

10. Apparatus according to claim 7 wherein the select inputs to the combustion application comprise fuel.

11. Apparatus according to claim 7 wherein the select inputs to the combustion application comprise electric power.

12. Apparatus according to claim 8 wherein the select inputs to the combustion application comprise electric power.

13. Apparatus according to claim 1 wherein the control system comprises means for providing calibration curves of select off-gas.

14. A method for process control in a combustion application, comprising:

a) transmitting a near-infrared laser beam through off-gas produced by the combustion application;
b) detecting the transmitted laser beam; and
c) adjusting select inputs of the combustion application in response to the detected transmitted laser beam.

15. A method according to claim 14 wherein the wavelength of the laser beam is in the range of about 0.7μm to about 3.0 μm.

16. A method according to claim 15 wherein the off-gas targeted for analysis is CO having a profile of strong lines as compared to H_20.

17. A method according to claim 15 wherein the off-gas targeted for analysis is H_20 having lines that respond differentially to changes in temperature.

18. A method according to claim 14 wherein the near infrared laser beam is transmitted by a tunable diode laser.

19. A method according to claim 18 wherein the wavelength of the laser beam is in the range of about 1.5 µm to about 1.7 µm.

20. A method according to claim 18 wherein the near-infrared laser beam is transmitted by a distributed feedback laser.

21. A method according to claim 20 wherein the wavelength of the laser beam is in the range of about 1.57 µm to about 1.59 µm.

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